Washington, D.C.
July 3, 1996

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street N.W., Room 222
Washington, D.C. 20554

RE: CC DOCKET 96-45

Dear Mr. Caton:

Sprint Corporation and U S WEST Inc. hereby submit for the record in this proceeding the attached Benchmark Cost Model 2 (BCM2). BCM2 represents a significant enhancement from the earlier submitted Benchmark Cost Model (BCM). Specifically, BCM2:

1. Provides a more accurate determination of the cost of serving sparsely populated rural areas.

2. More accurately reflects the cost elements of providing service in dense urban environments, and includes equipment costs which are necessary for the provision of telephone service which were not included in the original BCM.

3. Provides enhancements in the development of costs and provides additional user options.

Attached to this letter is an Executive Summary of BCM2 as well as model results for all 50 states and the District of Columbia. Model results for Puerto Rico, the Virgin Islands and Micronesia are being prepared and will be submitted at a later date. Also, within the next several days we will be filing three (3) copies of the BCM2 model on CD ROM. One copy will be provided for the Commission's permanent record in this proceeding, one copy will be be provided for the use of the Accounting and Audits Division and a third copy will be provided for International Transcription Services.

Sprint and U S WEST intend to present workshops on the BCM2 model and its operation during the NARUC Summer Meetings in Los Angeles, from July 19 through July 23. During these workshops detailed descriptions of the changes of in the model logic will be proviced and filed on the record in this proceeding. Workshops will also be presented in Washington, DC following the NARUC meetings. Specifics regarding these workshops will be provided at later date.

In accordance with Commission Rule 1.1206(a)(1) and Public Notice DA 95-211, released February 10, 1995, two copies of this letter are being filed with you for inclusion in the public record. Acknowledgment and date of receipt are requested. A copy of this transmittal letter is provided for this purpose. Please contact Glenn Brown on 202-429-3133 if you have any questions regarding this filing.

Sprint Corporation

U S WEST, Inc.

cc: Joint Board Commissioners
Joint Board Staff

071

Benchmark Cost Model:

A Joint Submission by

Sprint Corporation
U S WEST, Inc.

CC Docket No. 96-45
July 3, 1996

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EXECUTIVE SUMMARY

Benchmark Cost Model 2 (BCM2) is being submitted for the record in CC Docket No. 96-45 by Sprint and U S WEST. It represents a significant enhancement over the initial Benchmark Cost Model (BCM). The BCM was developed by the original Joint Sponsors[1] to:

> "...identify those CBGs in which the cost of providing basic telephone service is so high that some form of explicit high-cost support may be necessary as part of a universal service solution."

Since its initial release in September of 1995, and the publishing of data for 49 states and the District of Columbia in December, much has been written and said concerning the BCM. Some parties have modified key assumptions of the BCM and produced models which they claim to "correct" or "extend" the BCM.[2] Some parties have used its results as a proxy for the "cost" of providing basic telephone service, or used it to size a needed high cost fund. Some parties have criticized assumptions within the BCM and suggested alternative ways to estimate costs.

The Joint Sponsors have made every effort to inform the public on the workings of the BCM, and to gain input which can help to improve the model and its usefulness in the targeting of explicit high cost support funds. When the BCM results were placed on the record, a complete copy of the software which generated these results was placed on the record at the same time. The Joint Sponsors conducted four workshops (Washington, DC, Denver, CO, Portsmouth, NH and New Orleans, LA), to explain the BCM and provide copies of the software to interested parties. Over 200 representatives of industry and government attended these workshops. Based upon input from these workshops, as well as the comment and reply rounds in CC Dockets No. 80-286 and 96-45, the Joint Sponsors proposed modifications to the BCM which were placed on the record in ex-parte filings made January 26, 1996 and February 21, 1996. BCM2 represents the results of this input.

The original BCM was not designed to develop the cost of basic telephone service.[3] Since its primary intent was to identify high cost CBGs for which explicit support might be required, little attention was devoted in its development to precisely identifying cost structures in urban environments (where it was presumed that explicit high cost support would not be provided). In designing the model to identify high-cost areas, cost components which would be similar between high-cost and low-cost areas were omitted (e.g., drop

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[1] The Joint Sponsors of the BCM were MCI, NYNEX, Sprint and U S WEST.

[2] Hatfield and Associates, on behalf of AT&T and MCI, and Economics and Technology Inc., on behalf of NCTA have submitted models which modify key elements of the BCM. Sprint and U S WEST do not support the modifications proposed by Hatfield and ETI and believe they produce distorted and misleading results.

[3] Footnote 1 to the December 1, 1995 ex-parte letter states: "The Joint Sponsors do not agree on the use of the BCM for the pricing of telephone service."

pedestal, etc.). To simplify processing, an assumption was made that all customers were evenly distributed throughout the CBG.

BCM2 has been developed to expand the capabilities of the model to better respond to the demands and expectations which have been placed on the BCM beyond its original purpose. Modifications to the original BCM fall into three general categories:

1. Enhancements have been made in computing the cost in sparsely populated rural areas. Among the enhancements in BCM2 to better identify rural costs are:

   - BCM assumed a uniform population distribution throughout the CBG. While this assumption is reasonable in some areas, many CBGs contain large non-populated areas. To better identify populated areas, the road network within CBGs of less than 20 households per square mile has been analyzed. In these areas a buffer of 500 feet on either side of the roads has been created to define the populated area. Areas which fall outside of this buffer are excluded from the BCM2 analysis. The original number of households are assumed to be uniformly distributed in the reduced CBG area.

   - BCM computed the cost of constructing a wireline telephone network to all households regardless of the distance from the wire center or the density of the area. BCM2 recognizes that some customers may be more reasonably served by emerging "wireless loop" technologies by establishing a maximum investment per wireline loop.

   - BCM analysis was conducted on 49 States (excluding Alaska) and the District of Columbia. BCM2 analysis is being performed for all 50 states and the District of Columbia as well as Puerto Rico, the Virgin Islands and Micronesia.

2. Enhancements have been made in identifying the cost in urban environments. Urban distribution architectures have been modified to better reflect the placement of plant in dense suburban and urban environments. Several network elements not included in BCM are now included in BCM2. Among the enhancements made to better reflect the cost involved in providing telephone service are:

- A public source which provides information to determine the number of business lines in each CBG has been identified, and BCM2 now includes business lines in the outside plant architecture.

- BCM computed the cost of placing outside plant (e.g., trenching, plowing, conduit, etc.) by applying a multiplier to the cost of the cable which was being placed. This approach tended to understate placement costs of small sized cables, and overstate the cost of large cables. It also created the anomaly where, as supplier discounts of cable are increased (as several commenters have proposed), the cost of placing the cable is reduced by a similar proportion. To better reflect the cost of cable placement, BCM2 utilizes a two-step approach were the cost of placement is determined separately from the cost of the cable material.

- BCM utilized a simplified distribution architecture where feeder plant extended from the central office to the boundary of the CBG, and from that point four distribution cables of equal length serve all customers within the CBG. BCM2 has been modified to extend feeder plant into the CBG, where appropriate, and also engineers an appropriate number of distribution cables so that service is provided along each lot line

- Omitted from the original BCM analysis were the cost of the pedestal, drop wire drop wire and network interface device. These elements are necessary to provide telephone service and add approximately $200 of investment per household. In addition, BCM2 includes costs for engineering, splicing, cross-connects and inter-office trunking which were not included in BCM.

3. Enhancements have been made to provide more accuracy and flexibility in the processing of the model.

   - An enhanced switching module has been developed which more accurately determines the cost of switching, and better address the cost in a host/remote switching architecture.

   - The break point between copper and fiber, which had been "hard-coded" in BCM, is now subject to adjustment by the user.

   - Lines per household has been added as an input variable.

- The depth at which water becomes an additional cost and the amount of additional cost have been added as input variables.

- A variable to account for the impact of slope on outside plant costs has been added.

- The computation on expense elements has been enhanced. BCM used a single expense-to-investment multiplier to develop expenses and derive monthly costs. (Two factors were published in the BCM study, one based on ARMIS and another on a special study by MCI/Hatfield.) BCM2 has been modified to recognize that some expenses are related to investment (e.g., maintenance, depreciation, return, etc.) , but other expense categories are related to number of lines (e.g. billing, overheads, etc.).

Sprint and U S WEST have made every attempt in developing this model to accurately reflect the current cost of building a telephone network capable of providing service of the high quality demanded by our customers and our regulators.

Sprint has interests in long distance services, local telephony and emerging wireless services. U S WEST has interests in local telephony and in cable and cable/telephony services. Because of our diverse interests we believe that the BCM2 presents a balanced and realistic view of the cost of supporting universal telephone service. We have not attempted to model a hyper-efficient, low cost yet totally unrealistic "fantasy network" Neither have we suggested that high cost funds should be designed to cover the total embedded cost of the local network. We are committed to making the model and all data sources open to public inspection and scrutiny. We encourage the proponents of all other models proposed for use in developing universal service solutions to do the same.

Sprint and U S WEST remain convinced that the results of BCM2, by themselves, are not appropriate for the pricing of telephone service. However, since other parties have utilized the results of BCM to develop studies which they have suggested form the basis for the pricing of telephone services and unbundled network elements, we believe that BCM2 can serve as the basis for a critique of these studies (notably the Hatfield Study) and their applicability to pricing. As stated above and documented in the study, the original BCM omitted significant cost elements which are necessary for the provision of telephone service. Also, as documented in this study, the BCM did not accurately determine the cost of providing telephone service in dense urban environments. Before any study is used as the basis for pricing, it must accurately reflect the cost of the service which it is seeking to price. For this reason, we believe that studies premised on the BCM would be inappropriate for the pricing of telephone service

We believe that the BCM2 can be an important tool in the analysis of high cost areas, and can be valuable in designing explicit support mechanisms to assure the preservation of universal service in such areas.

Benchmark Cost Model 2 Results

State: Total United States

Date: 7/3/96
Time: 1:44:44 PM

Aggregate Support		ARMIS
At $20 =	$	14,665,589,457
At $30 =	$	7,425,225,158
At $40 =	$	4,259,037,798
At $50 =	$	2,400,873,879
At $60 =	$	1,312,436,253
At $70 =	$	792,098,640
At $80 =	$	506,897,774
Annual Benchmark Cost =	$	59,252,447,515
State Average Monthly Cost=	$	29.98

Density	Households	Lines
Less 5	555,672	792,684
5 to 200	23,974,807	37,406,567
200 to 650	12,129,492	23,085,126
650 to 850	4,201,798	7,977,826
850 to 2550	27,128,806	49,743,902
Greater 2550	23,999,380	45,680,192
Total	91,989,955	164,686,297

	ARMIS
Cost Category	Households
$0<=$ 5	-
$5<=$10	-
$10<=$15	981,750
$15<=$20	10,420,160
$20<=$25	20,266,264
$25<=$30	20,631,474
$30<=$35	14,797,965
$35<=$40	6,060,026
$40<=$45	3,438,612
$45<=$50	2,969,017
$50<=$55	3,438,402
$55<=$60	2,919,963
$60<=$65	1,857,614
$65<=$70	1,097,581
$70<=$75	763,721
$75<=$100	1,707,188
$100<=$150	496,687
$150<=$200	90,889
$200<=$250	50,202
$250<=$300	1,670
$300<=$500	731
$500<=$1000	23
$1000+	16
Total Households	91,989,955

Loop Category	Households
0 <= 5Kft	10,409,700
5Kft <= 10Kft	23,614,400
10Kft <= 15Kft	19,649,583
15Kft <= 20Kft	12,727,298
20Kft <= 25Kft	7,955,729
25Kft <= 30Kft	5,269,816
30Kft <= 40Kft	6,254,678
40Kft <= 50Kft	3,141,841
50Kft <= 60Kft	1,436,846
60Kft <=70Kft	680,038
70Kft <= 80Kft	335,679
80Kft <= 90Kft	184,678
90Kft <= 100Kft	114,180
100Kft <=150Kft	168,550
150Kft <= 200Kft	37,512
200Ktf+	9,157

Loop Information	Length
Minimum Loop Length	1,645
Maximum Loop Length	673,008
Average Loop Length	15,581

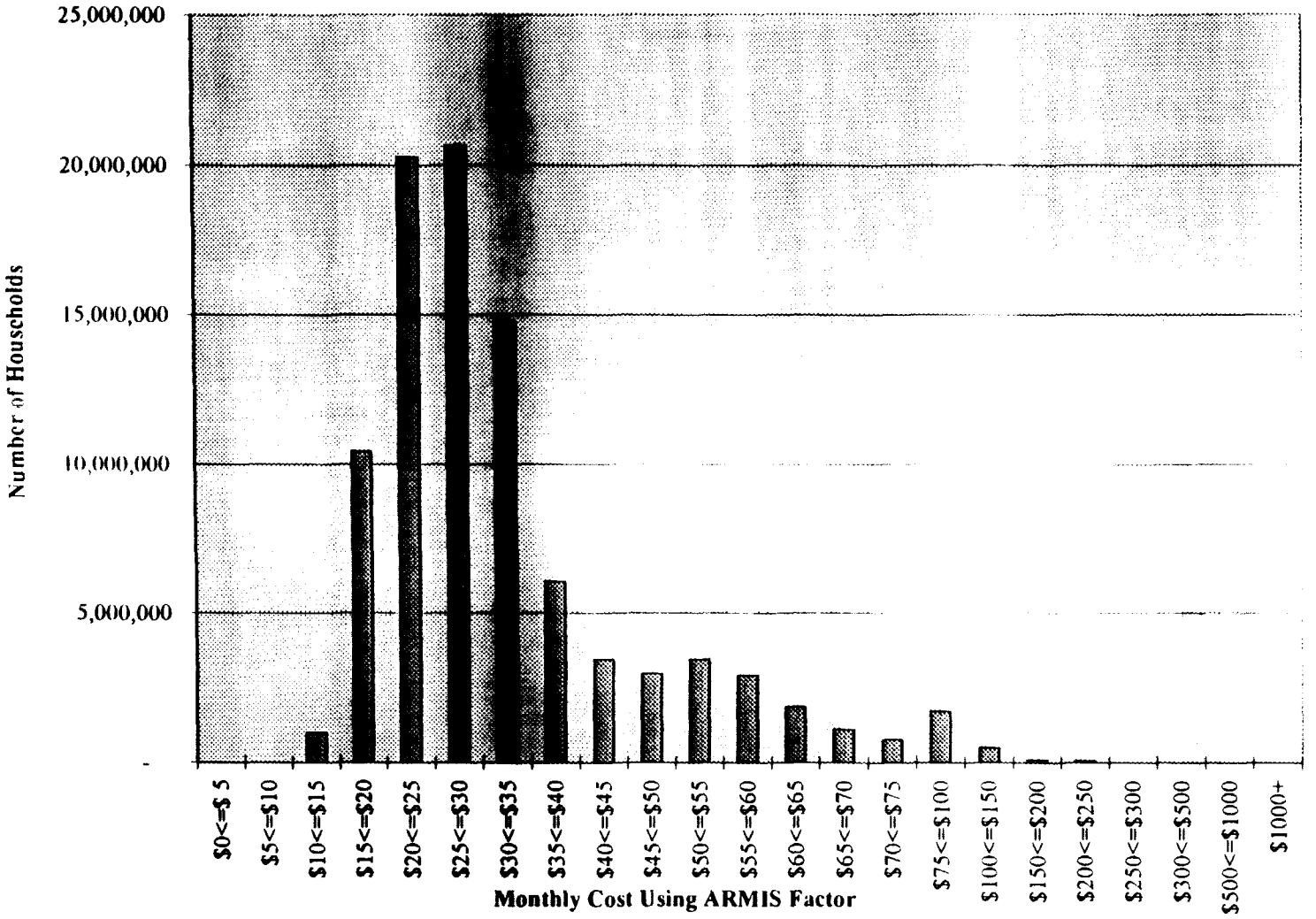
Maximum Monthly Cost	$1,089.04
Average Monthly Cost	$29.98
Lines Above $10K Loop Inv	52,243

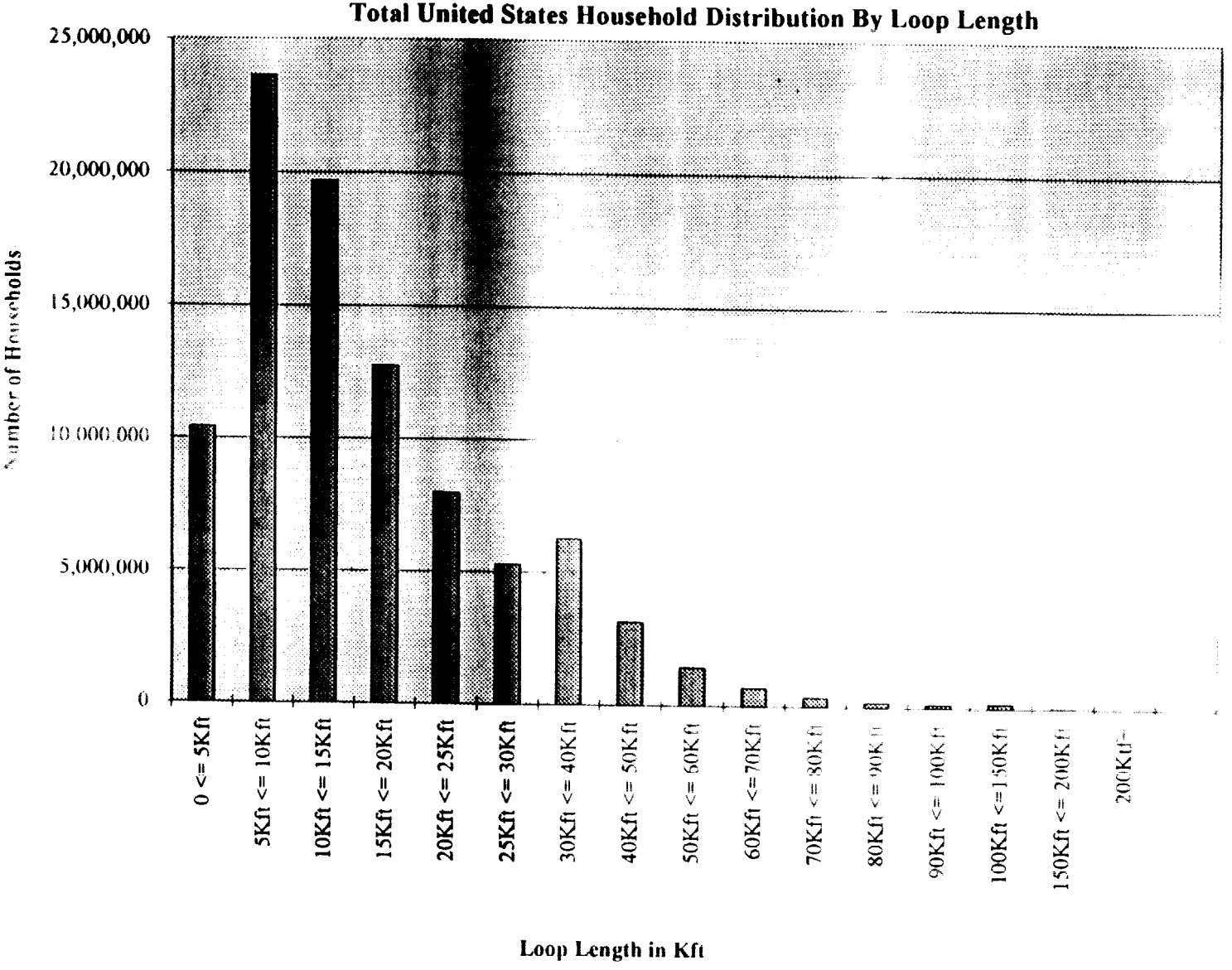
State: **Total United States**

Date: **7/3/96**
Time: **1:44:44 PM**

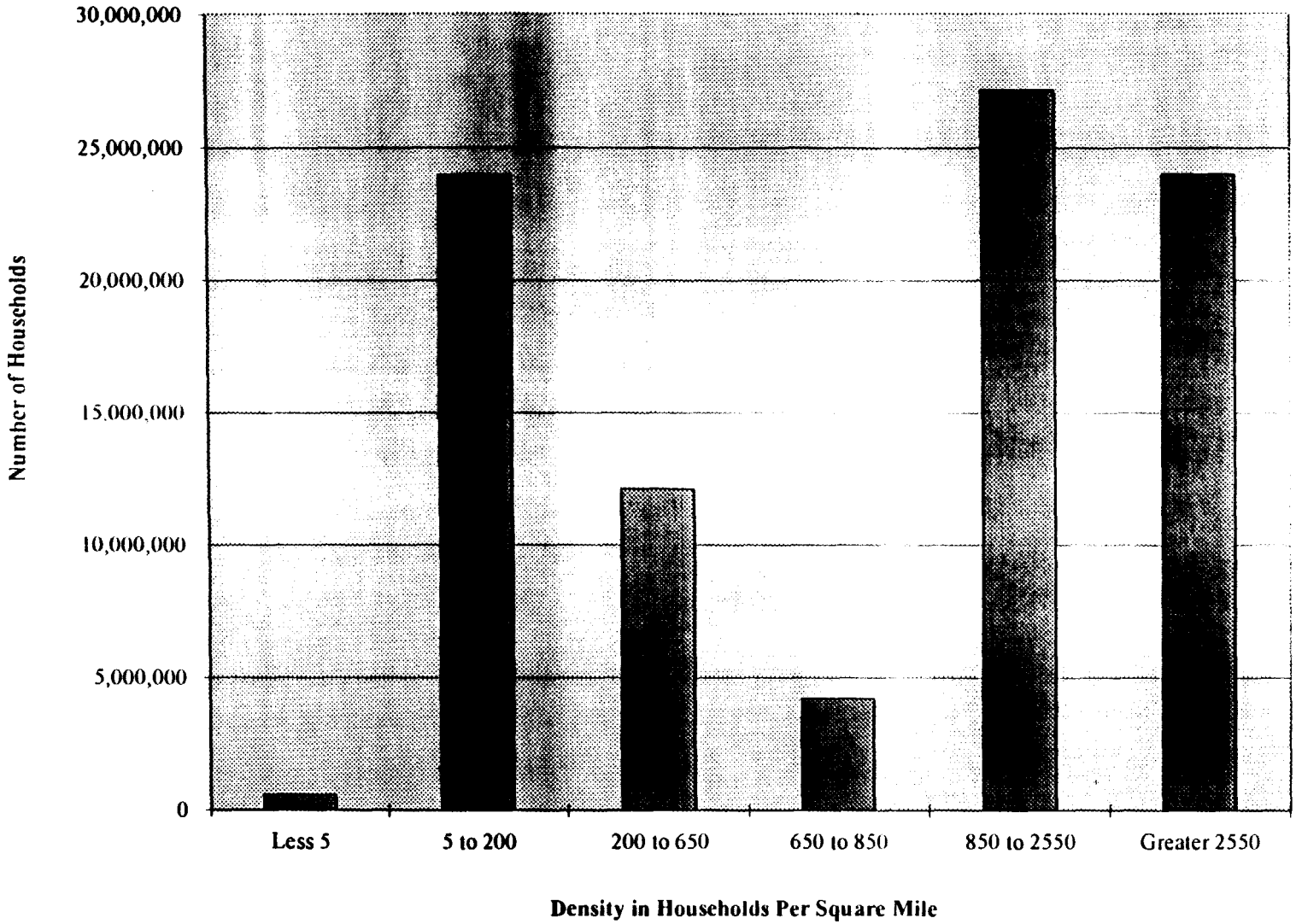
Density	Summary Results	Weighted
Less 5	Sum of # Households	555,672
	Sum of # Lines	792,684
	Average of Loop Length	78.542
	Average of Loop $ per Line	$4,991
	Average of Total Invstmnt $/Ln	$5,468
	Average of Monthly Cost1	$116.16
5 to 200	Sum of # Households	23,974,807
	Sum of # Lines	37,406,567
	Average of Loop Length	29.750
	Average of Loop $ per Line	$1,845
	Average of Total Invstmnt $/Ln	$2,014
	Average of Monthly Cost1	$48.14
200 to 650	Sum of # Households	12,129,492
	Sum of # Lines	23,085,126
	Average of Loop Length	15.843
	Average of Loop $ per Line	$824
	Average of Total Invstmnt $/Ln	$942
	Average of Monthly Cost1	$27.08
650 to 850	Sum of # Households	4,201,798
	Sum of # Lines	7,977,826
	Average of Loop Length	13.338
	Average of Loop $ per Line	$803
	Average of Total Invstmnt $/Ln	$915
	Average of Monthly Cost1	$26.51
850 to 2550	Sum of # Households	27,128,806
	Sum of # Lines	49,743,902
	Average of Loop Length	11.292
	Average of Loop $ per Line	$698
	Average of Total Invstmnt $/Ln	$806
	Average of Monthly Cost1	$24.35
Greater 2550	Sum of # Households	23,999,380
	Sum of # Lines	45,680,192
	Average of Loop Length	7.815
	Average of Loop $ per Line	$577
	Average of Total Invstmnt $/Ln	$681
	Average of Monthly Cost1	$21.83

Total United States Household Distribution By Residential Service Monthly Cost

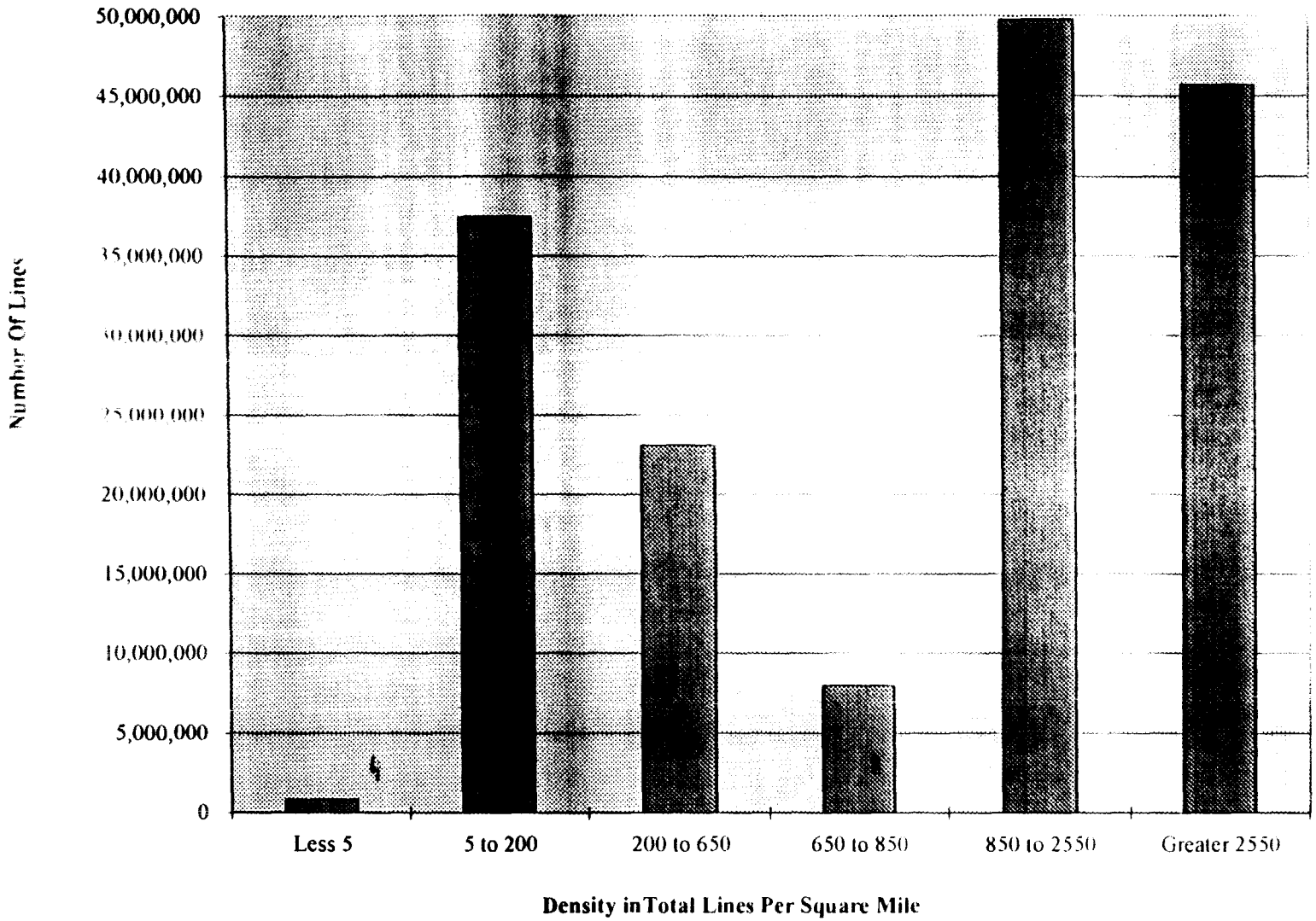



Total United States Household Distribution By Loop Length
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
Number of Households
0 <= 5Kft
5Kft <= 10Kft
10Kft <= 15Kft
15Kft <= 20Kft
20Kft <= 25Kft
25Kft <= 30Kft
30Kft <= 40Kft
40Kft <= 50Kft
50Kft <= 60Kft
60Kft <= 70Kft
70Kft <= 80Kft
80Kft <= 90Kft
90Kft <= 100Kft
100Kft <= 150Kft
150Kft <= 200Kft
200Kft+
Loop Length in Kft

Total United States Household Distribution By Density Group



Total United States Total Lines Distribution By Density Group



State: Alabama

Date: 7/1/96
Time: 2:23:10 PM

Aggregate Support		ARMIS
	At $20 = $	348,584,207
	At $30 = $	198,586,867
	At $40 = $	108,269,733
	At $50 = $	47,790,106
	At $60 = $	16,226,192
	At $70 = $	5,986,460
	At $80 = $	2,041,919
Annual Benchmark Cost =	$	1,053,528,112
State Average Monthly Cost=	$	36.25

Density	Households	Lines
Less 5	1,326	1,68[illegible]
5 to 200	765,167	1,120,498
200 to 650	265,121	440,114
650 to 850	72,158	129,203
850 to 2550	344,920	614,550
Greater 2550	57,317	116,042
Total	1,506,009	2,422,089

	ARMIS
Cost Category	Households
$0<=$ 5	-
$5<=$10	-
$10<=$15	3,318
$15<=$20	50,129
$20<=$25	190,786
$25<=$30	278,238
$30<=$35	246,073
$35<=$40	137,963
$40<=$45	95,526
$45<=$50	103,631
$50<=$55	137,634
$55<=$60	121,876
$60<=$65	59,128
$65<=$70	33,702
$70<=$75	15,342
$75<=$100	30,982
$100<=$150	1,632
$150<=$200	39
$200<=$250	10
$250<=$300	-
$300<=$500	-
$500<=$1000	-
$1000+	-
Total Households	1,506,009

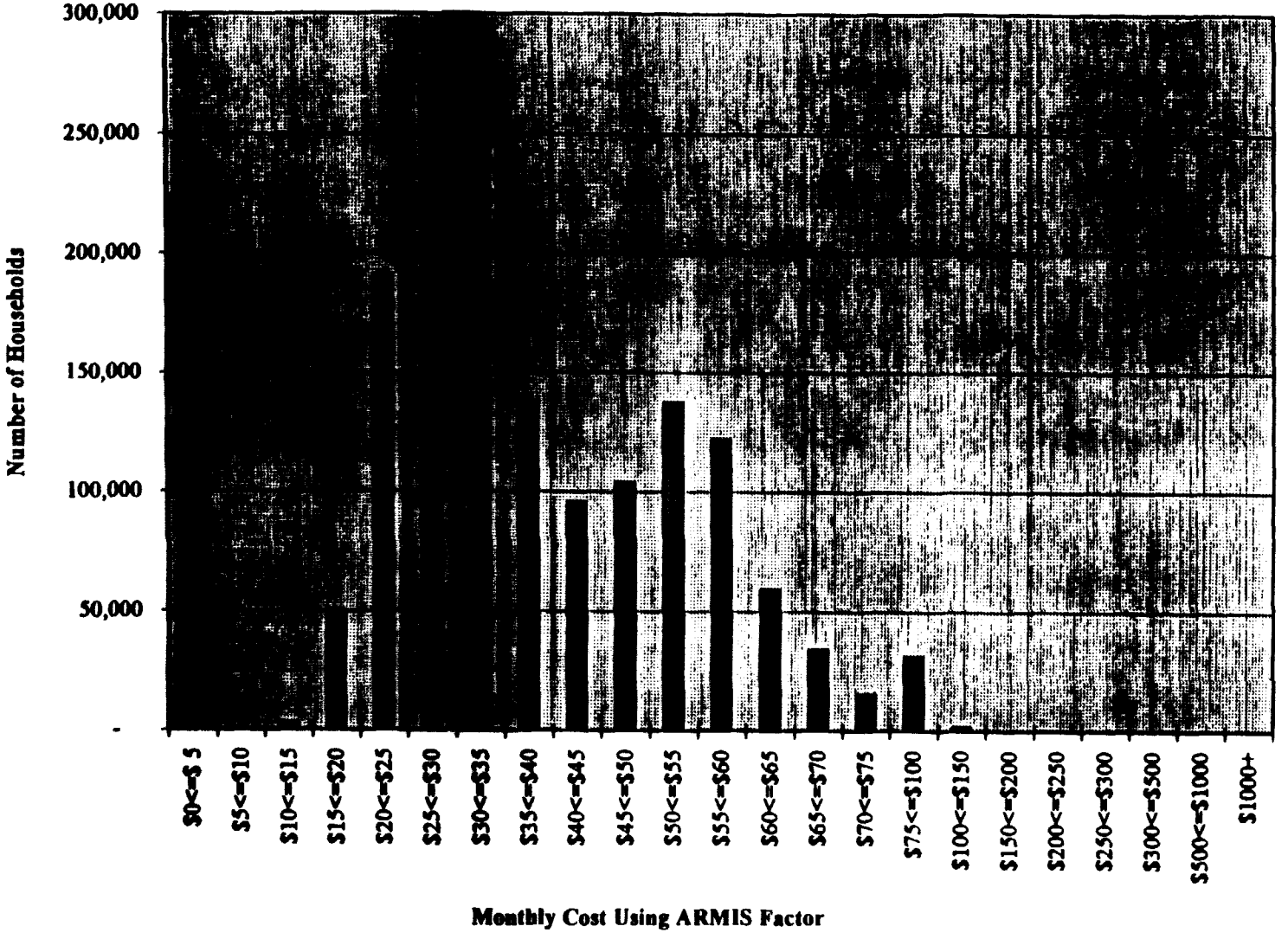
Loop Category	Households
0 <= 5Kft	59,638
5Kft <= 10Kft	214,183
10Kft <= 15Kft	235,819
15Kft <= 20Kft	182,786
20Kft <= 25Kft	169,433
25Kft <= 30Kft	129,008
30Kft <= 40Kft	223,338
40Kft <= 50Kft	124,803
50Kft <= 60Kft	90,826
60Kft <=70Kft	36,470
70Kft <= 80Kft	22,503
80Kft <= 90Kft	9,663
90Kft <= 100Kft	4,863
100Kft <=150Kft	2,676
150Kft <= 200Kft	-
200Ktf+	-

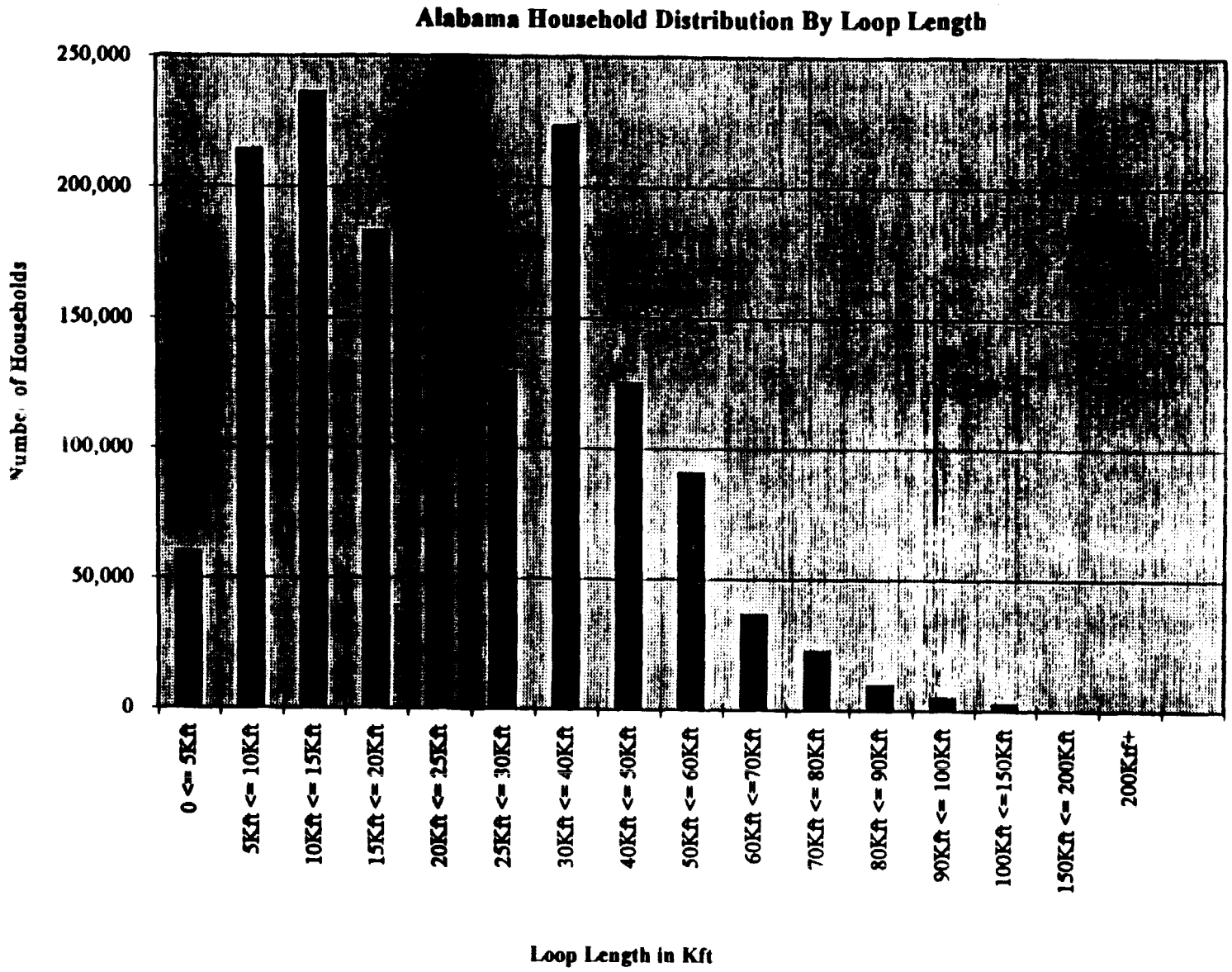
Loop Information	Length
Minimum Loop Length	1,156
Maximum Loop Length	116,775
Average Loop Length	24,029

Maximum Monthly Cost	$210.73
Average Monthly Cost	$36.25
Lines Above $10K Loop Inv	12

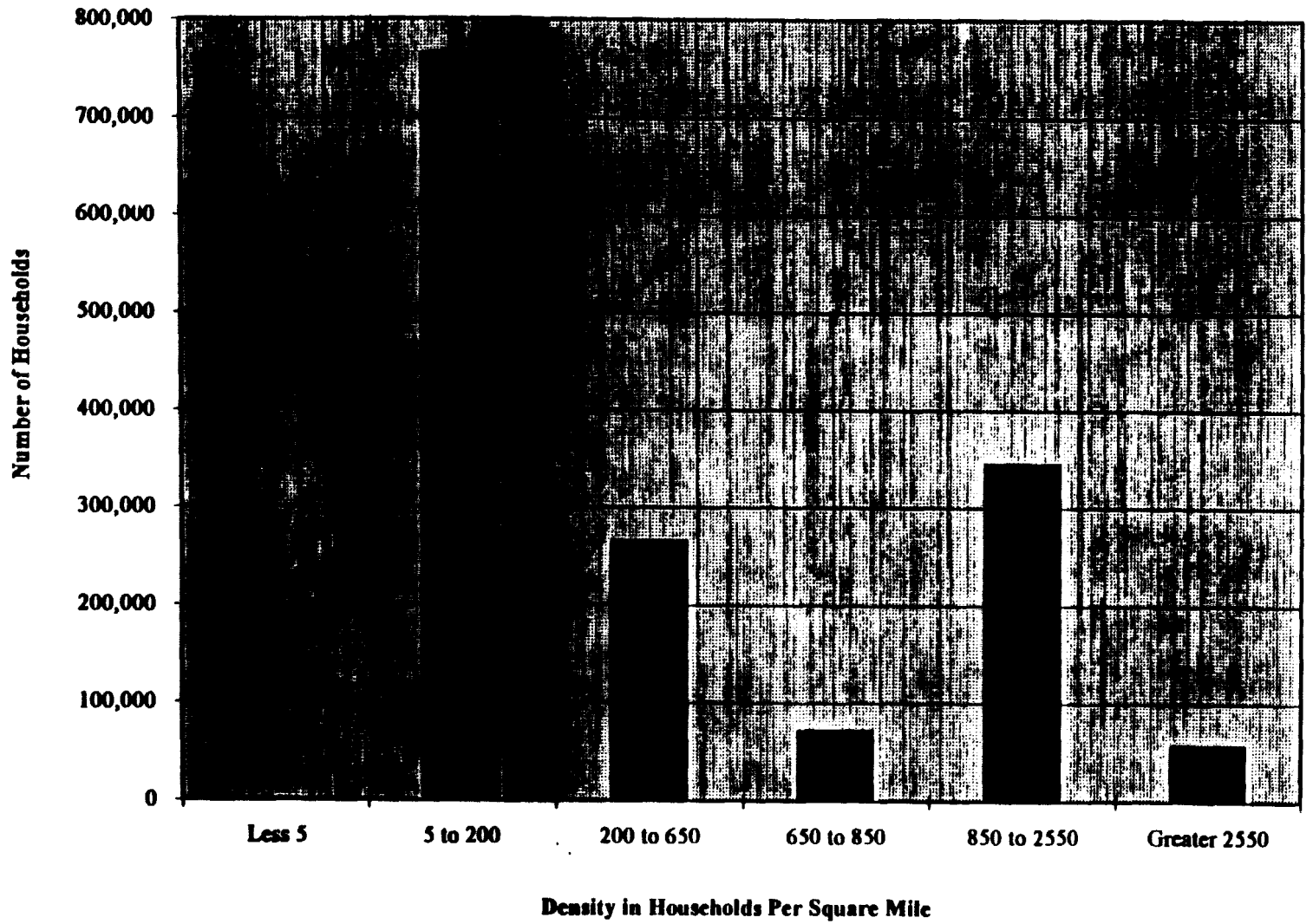
Density	Summary Results	Weighted
Less 5	Sum of # Households	1,326
	Sum of # Lines	1,682
	Average of Loop Length	66,134
	Average of Loop $ per Line	$4,020
	Average of Total Invstmnt $/Ln	$4,254
	Average of Monthly Cost1	$92.09
5 to 200	Sum of # Households	765,167
	Sum of # Lines	1,120,498
	Average of Loop Length	35,285
	Average of Loop $ per Line	$1,862
	Average of Total Invstmnt $/Ln	$2,015
	Average of Monthly Cost1	$48.12
200 to 650	Sum of # Households	265,121
	Sum of # Lines	440,114
	Average of Loop Length	18,256
	Average of Loop $ per Line	$866
	Average of Total Invstmnt $/Ln	$985
	Average of Monthly Cost1	$27.93
650 to 850	Sum of # Households	72,158
	Sum of # Lines	129,203
	Average of Loop Length	13,806
	Average of Loop $ per Line	$821
	Average of Total Invstmnt $/Ln	$936
	Average of Monthly Cost1	$26.92
850 to 2550	Sum of # Households	344,920
	Sum of # Lines	614,550
	Average of Loop Length	12,432
	Average of Loop $ per Line	$722
	Average of Total Invstmnt $/Ln	$830
	Average of Monthly Cost1	$24.81
Greater 2550	Sum of # Households	57,317
	Sum of # Lines	116,042
	Average of Loop Length	9,416
	Average of Loop $ per Line	$649
	Average of Total Invstmnt $/Ln	$755
	Average of Monthly Cost1	$23.31

Alabama Household Distribution By Residential Service Monthly Cost

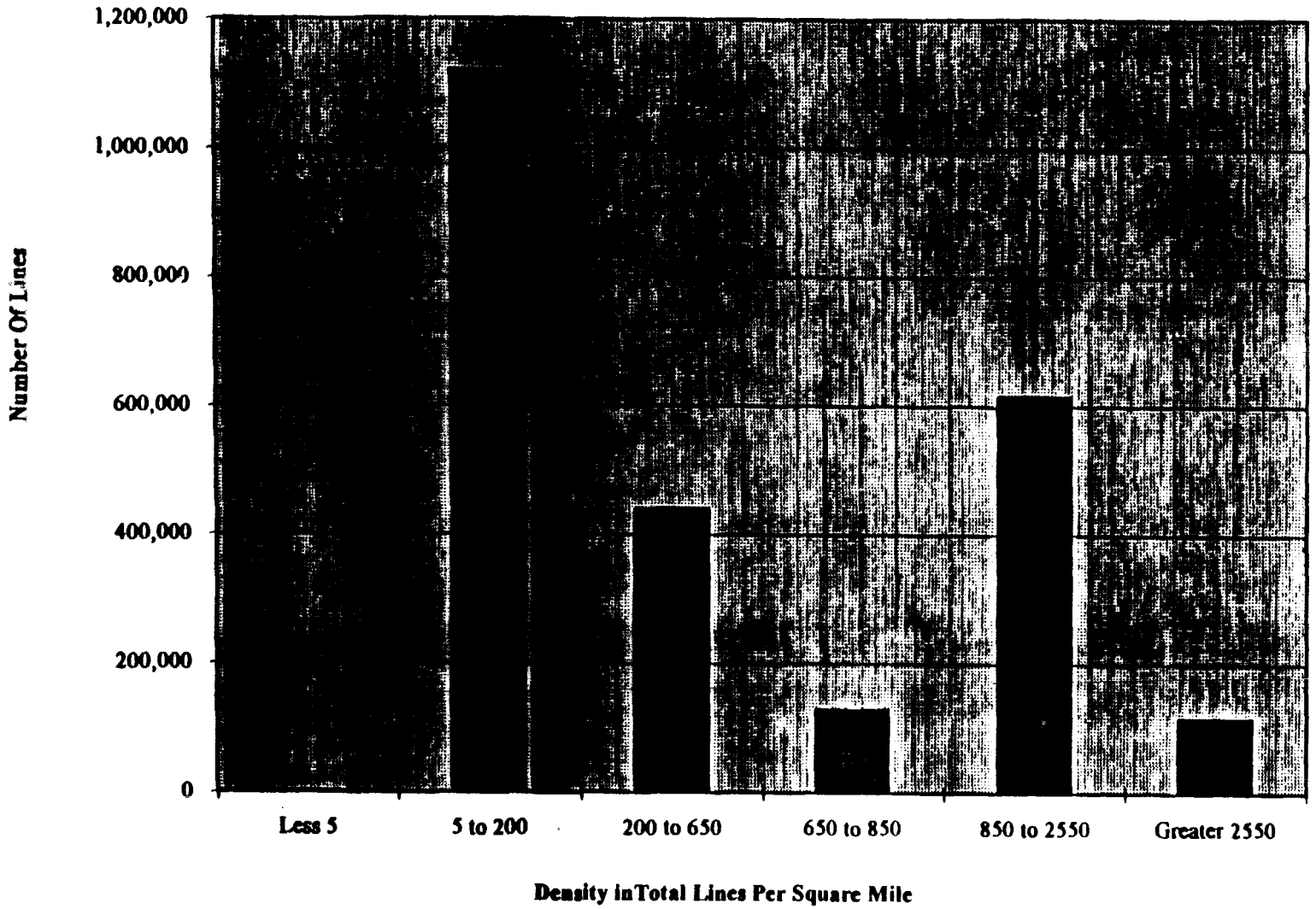



Alabama Household Distribution By Loop Length
Number of Households
250,000
200,000
150,000
100,000
50,000
0
0 <= 5Kft
5Kft <= 10Kft
10Kft <= 15Kft
15Kft <= 20Kft
20Kft <= 25Kft
25Kft <= 30Kft
30Kft <= 40Kft
40Kft <= 50Kft
50Kft <= 60Kft
60Kft <=70Kft
70Kft <= 80Kft
80Kft <= 90Kft
90Kft <= 100Kft
100Kft <=150Kft
150Kft <= 200Kft
200Kft+
Loop Length in Kft

Alabama Household Distribution By Density Group



Alabama Total Lines Distribution By Density Group



State: Alaska

Date: 7/1/96
Time: 2:23:07 PM

Aggregate Support		ARMIS
At $20 =	$	57,550,951
At $30 =	$	38,993,832
At $40 =	$	27,791,220
At $50 =	$	21,088,942
At $60 =	$	16,208,681
At $70 =	$	13,006,470
At $80 =	$	10,727,646
Annual Benchmark Cost =	$	176,766,281
State Average Monthly Cost=	$	38.94

Density	Households	Lines
Less 5	4,384	10,053
5 to 200	77,502	126,660
200 to 650	23,618	51,232
650 to 850	4,679	11,088
850 to 2550	52,659	107,923
Greater 2550	25,765	71,375
Total	188,607	378,332

Cost Category	ARMIS Households
$0<=$ 5	-
$5<=$10	-
$10<=$15	394
$15<=$20	6,849
$20<=$25	24,034
$25<=$30	34,756
$30<=$35	31,208
$35<=$40	26,197
$40<=$45	9,738
$45<=$50	7,218
$50<=$55	7,853
$55<=$60	7,286
$60<=$65	6,330
$65<=$70	4,257
$70<=$75	3,089
$75<=$100	8,392
$100<=$150	5,956
$150<=$200	2,816
$200<=$250	1,613
$250<=$300	511
$300<=$500	93
$500<=$1000	7
$1000+	10
Total Households	188,607

Loop Category	Households
0 <= 5Kft	12,843
5Kft <= 10Kft	27,982
10Kft <= 15Kft	34,796
15Kft <= 20Kft	24,361
20Kft <= 25Kft	20,152
25Kft <= 30Kft	13,569
30Kft <= 40Kft	21,439
40Kft <= 50Kft	9,843
50Kft <= 60Kft	6,905
60Kft <=70Kft	3,055
70Kft <= 80Kft	572
80Kft <= 90Kft	1,169
90Kft <= 100Kft	2,692
100Kft <=150Kft	4,335
150Kft <= 200Kft	3,651
200Ktf+	1,243

Loop Information	Length
Minimum Loop Length	1,306
Maximum Loop Length	673,008
Average Loop Length	26,637

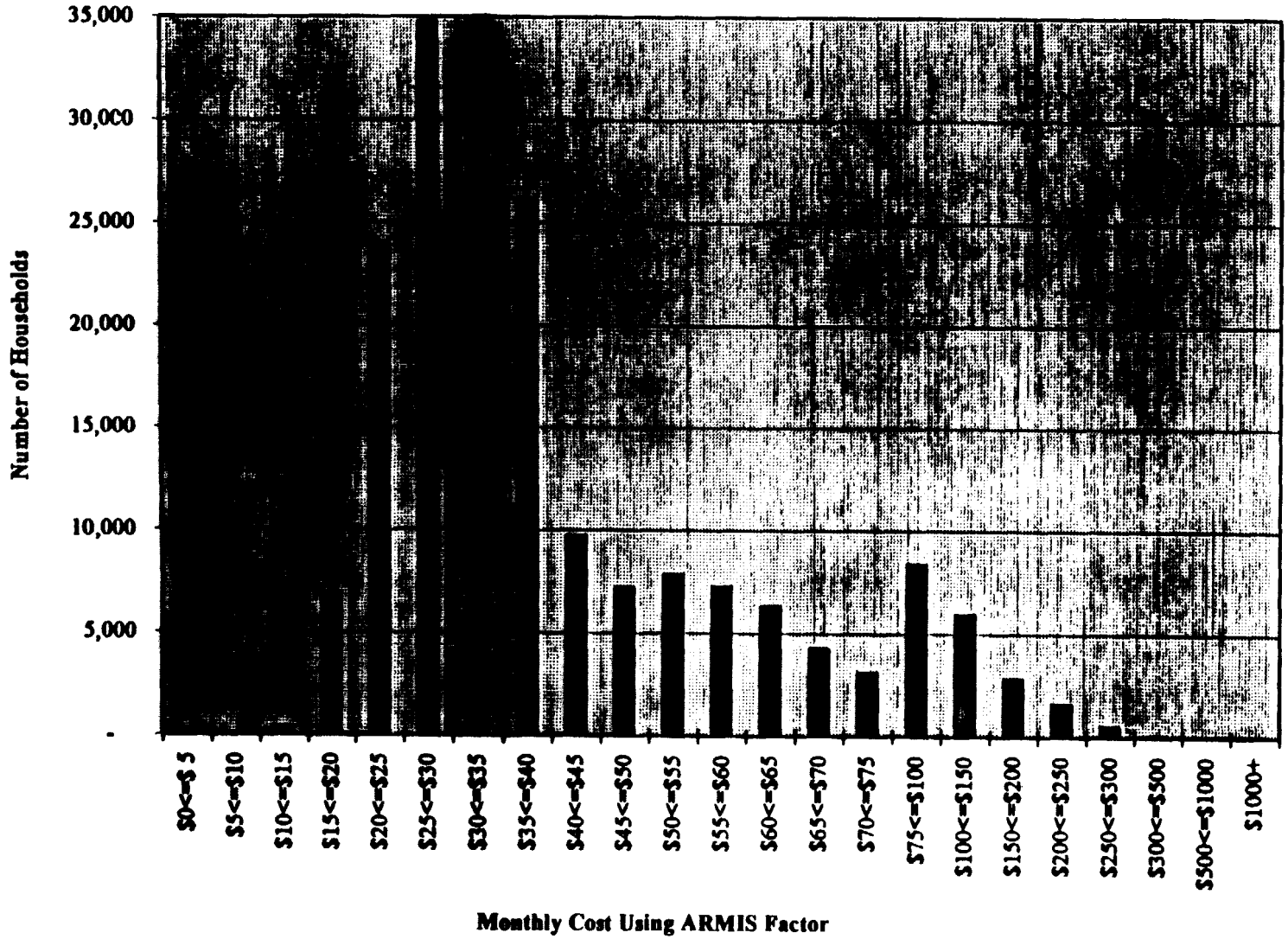
Maximum Monthly Cost	$1,089.04
Average Monthly Cost	$38.94
Lines Above $10K Loop Inv	1,817

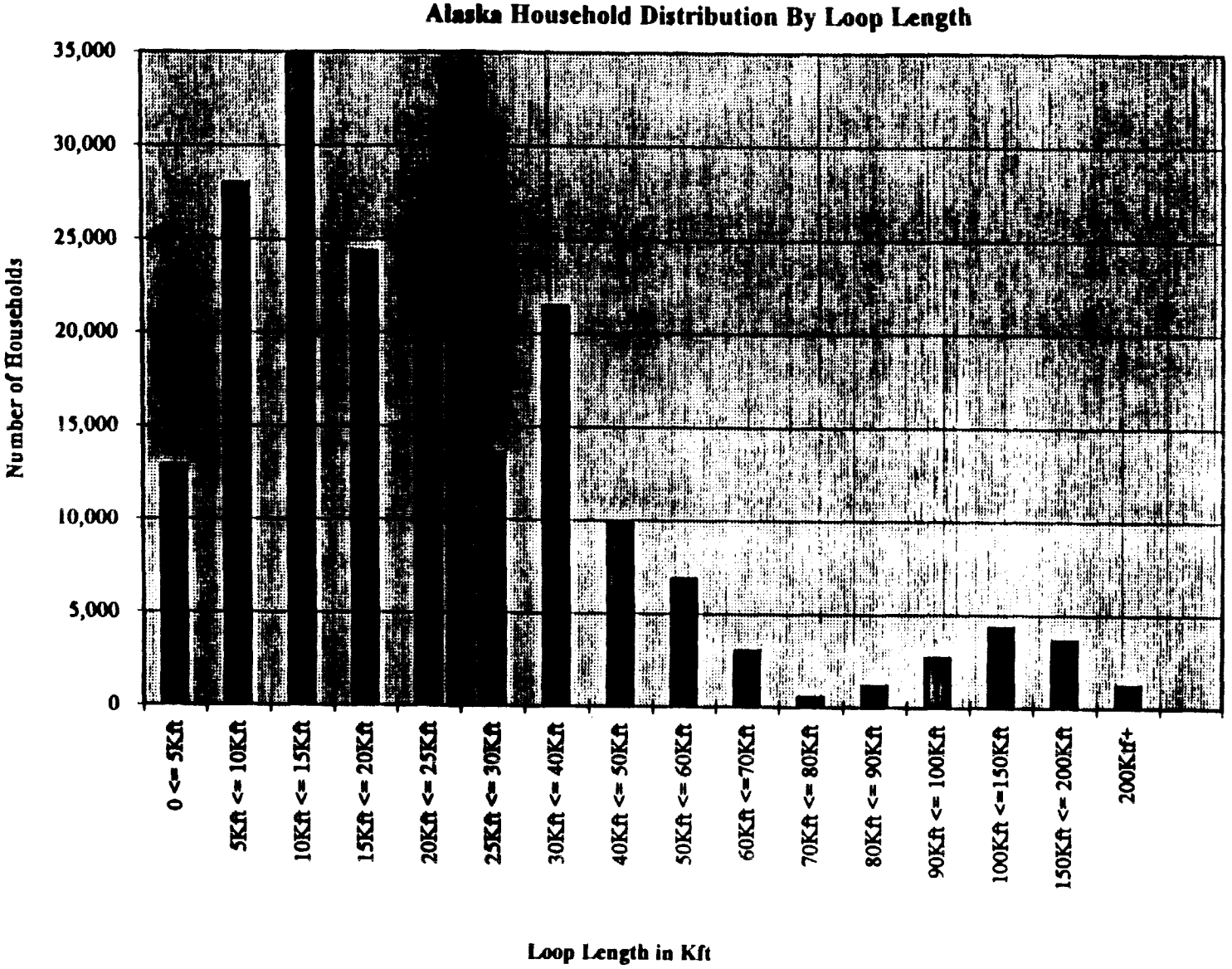
State: **Alaska**

Date: **7/1/96**
Time: **2:23:07 PM**

Density	Summary Results	Weighted
Less 5	Sum of # Households	4,384
	Sum of # Lines	10,053
	Average of Loop Length	143,005
	Average of Loop $ per Line	$5,353
	Average of Total Invstmnt $/Ln	$6,436
	Average of Monthly Cost1	$136.08
5 to 200	Sum of # Households	77,502
	Sum of # Lines	126,660
	Average of Loop Length	42,575
	Average of Loop $ per Line	$2,116
	Average of Total Invstmnt $/Ln	$2,415
	Average of Monthly Cost1	$56.17
200 to 650	Sum of # Households	23,618
	Sum of # Lines	51,232
	Average of Loop Length	16,272
	Average of Loop $ per Line	$849
	Average of Total Invstmnt $/Ln	$982
	Average of Monthly Cost1	$27.89
650 to 850	Sum of # Households	4,679
	Sum of # Lines	11,088
	Average of Loop Length	15,276
	Average of Loop $ per Line	$826
	Average of Total Invstmnt $/Ln	$951
	Average of Monthly Cost1	$27.25
850 to 2550	Sum of # Households	52,659
	Sum of # Lines	107,923
	Average of Loop Length	13,257
	Average of Loop $ per Line	$783
	Average of Total Invstmnt $/Ln	$899
	Average of Monthly Cost1	$26.20
Greater 2550	Sum of # Households	25,765
	Sum of # Lines	71,375
	Average of Loop Length	11,401
	Average of Loop $ per Line	$658
	Average of Total Invstmnt $/Ln	$770
	Average of Monthly Cost1	$23.66

Alaska Household Distribution By Residential Service Monthly Cost




Alaska Household Distribution By Loop Length
Number of Households
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0 <= 5Kft
5Kft <= 10Kft
10Kft <= 15Kft
15Kft <= 20Kft
20Kft <= 25Kft
25Kft <= 30Kft
30Kft <= 40Kft
40Kft <= 50Kft
50Kft <= 60Kft
60Kft <=70Kft
70Kft <= 80Kft
80Kft <= 90Kft
90Kft <= 100Kft
100Kft <=150Kft
150Kft <= 200Kft
200Kft+
Loop Length in Kft